INTERNATIONAL PRELIMINARY OFFICE ACTION

Int. File No. PCT/EP 03/08117

I. Basis of the Office Action

1. With Respect to the Components of the International Application (Replacement Pages Which Were Presented to the Application Agency upon a Request in Accordance to Article 14, Are Considered as "Originally Filed" within the Scope of This Office Action and Are not Enclosed because They Contain no Changes (Rules 70.16 and 70.17)):

Description, Pages:

3-7	Original version
1,2,2a	Received on 6/7/04 by ltr. of 6/3/04

Claims, No.:

1 - 8	Received on 6/7/04 by ltr. of 6/3/04

Drawings, Sheets:

1/3 - 3/3	Original version

Drawings, Figures:

1-4	Original version

V. Substantiated Determination According to Article 35(2) with Respect to the Novelty, the Inventive Activity and the Industrial Applicability; Documents and Declarations for Supporting This Determination

1. Determination

Novelty (N) Yes: Claims 1-8

Inventive Activity (IS) Yes: Claims 1-8

Industrial Applicability (IA) Yes: Claims 1-8

2. Documents and Declarations

See Attached Page

Concerning Point V

Substantiated Determination According to Rule 66.2(a)(ii) with Respect to the Novelty, the Inventive Activity and the Industrial Applicability; Documents and Explanations for Supporting This Determination

1. Reference is made to the following documents:

D1: EP-A-0 461 104 (IFE GMBH) Dec. 11, 1991 (1991-12-11)

D2: GB-A-2 283 054 (IFE GMBH) Apr. 26, 1995 (1995-04-26)

D3: EP-A-0 478 536 (IFE GMBH) Apr. 1, 1992 (1992-04-01)

2. Although Claim 1 meets the requirements of Article 33 (2) and (3) PCT with respect to the found prior art, amendments would have been necessary in order to eliminate the following objections:

a) The word "optionally" in Claim 1, Line 3, suggests that the rotatability of the carriage (2) is an option. In fact, this contradicts the specification (compare Page 3, Line 5, an on). The word "optionally" would have had to be eliminated for arriving at a clear claim.

b) The description of a sliding hinge joint used in the characterizing part of Claim 1 "... which permits a relative

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rotating movement as well as a displacing movement in the joint area..." is insufficient for clearly delimiting the object of Claim 1 from the prior art. In fact, also in the D1 (compare

Figure 3), a relative rotating movement takes place between the carriage (5 in D1) and the driving device (9 in D1) or a displacement movement takes place between the leaf (10 in D1) and the roller (12 in D1). The description of the sliding hinge joint in Claim 1 of the application would have had to clearly indicate that the (possibly "a projection (8) on the") rotatable spindle nut (4) is rotatable about an abutment (7) therefore defining the joint area on the carriage (2) and is radially displaceable (compare application, Page 4, Lines 7-14).

c) As indicated in b) (compare "...rotatable spindle nut..."), it is also essential for the claimed invention that the spindle nut of the spindle drive is not, as the spindle nut of a linear drive, as in D1, fixed within the drive with respect to rotation. This is not clearly indicated in Claim 1 of the application.

3. Document D1, which is considered to be the closest prior art, discloses (compare Column 1, Lines 33-51; Column 2, Line 51 - Column 3, Line 26) a drive for a swinging sliding door, in the case of which faces are provided on the carrying control device? (translator)/carriage carrying the door which interact

driving device of a linear drive, for the longitudinal displacement of the door.

The object of a Claim 1 clarified according to 2. would have differed from the known drive in that a spindle drive would have been used whose spindle is connected with the carrying control device (?)/carriage by means of a sliding hinge joint.

The object of such a Claim 1 would have been new (Article 33(2) PCT).

The object to be achieved by means of the present invention could have been

considered to be to provide a lower-maintenance drive for a swinging sliding door.

The solution suggested for this object in a Claim 1 clarified according to 2. would have been based on an inventive activity (Article 33(3) PCT) for the following reasons:

A spindle drive would have been used instead of a linear drive, in the case of which, for causing a linear movement of the spindle nut and of the carrying control device/carriage, the rotating movement of the spindle nut about the spindle had to be limited and an articulated connection had to exist between the spindle nut and the carrying control device/carriage. In the prior art, only drives are known where this is achieved in that the spindle nut is connected in an articulated manner by means of a connecting rod with the carrying control device/carriage, so that the latter limits the rotating movement of the spindle nut. The replacement of the connecting rod by a space-saving and direct connection between the spindle nut and the carrying control device/carriage by means of a sliding hinge joint is neither known nor suggested in the prior art.

4. If they had been dependent on such a clarified independent Claim 1, the dependent Claims 2 to 8 also would have met the requirements of the PCT with respect to novelty and inventive activity.

Enclosure 1 to the Letter of June 3, 2004

International Application PCT/EP 03/08117 - P42237

DRIVE FOR A SLIDING DOOR OR A SWINGING-SLIDING DOOR

The invention relates to the drive of a sliding door or swinging-sliding door of a rail vehicle, having a guide rail fixed with respect to the rail vehicle, on which guide rail a carriage is longitudinally displaceably and optionally rotatably arranged, which carriage carries a door leaf, and having a spindle drive whose spindle extends parallel to the guide rail and whose spindle nut is fixedly connected with the carriage in the direction of the axis of the spindle.

A similar drive is known from the applicant's European Patent Document EP 0 461 104 A. However, in this case, instead of providing a spindle drive, a linear drive is provided whose driving device can move only along a straight line extending parallel to the guide rail. The transmission of force from the driving device to the carriage takes place in that the driving device is arranged between two wings of the carriage which extend in a normal manner with respect to the guide rail, the wings being so large that, during the rotating movement of the carriage the driving device does not leave this area. This solution has been successful in general. However, since linear drives are expensive as well as maintenance-intensive particularly in

comparison to spindle drives, a solution is needed with respect to a spindle drive in which the rotating position of the spindle nut is defined by the output. The known solution is not suitable for this purpose.

Different constructions of swinging-sliding doors exist which implement the tilt-out and sliding movement of the door leaf in different manners and in the process also establish the connection between the actual drive and the door leaf in different manners.

In a construction which has been known for some time and has been successful, the door leaf hangs on a carriage which itself is displaceable along a circular guide rail fixed to the body. The carriage can also be swiveled about the guide rail, and the door leaf is also linked to the carriage and is swivellable parallel to the axis of the guide rail, whereby the tilt-out movement of the door leaf is ensured. The drive takes place by way of a driving spindle rotatable about itself and fixed to the body and by way of a spindle nut running on the spindle. The connection between the spindle nut and the carriage takes place by way of a connecting rod which can be swiveled on the spindle nut as well as on the carriage in each case about an axis parallel to the axis of the guide rail.

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This construction has essentially been successful and, as mentioned above, has been used for some time but still has certain disadvantages: The connecting rod, by which the moving forces for the door leaf are transmitted in the direction of the axis of the guide rail, is stressed with respect to bending and shear by these considerable forces. These forces have to be transmitted by the two hinge joints, which requires that they be constructed in a correspondingly massive and therefore heavy and expensive manner. As a result of the relatively large distance of the connecting rod or its hinge joints with respect to the axis of the guide rail, on the one side, and with respect to the axis of the spindle, on the other side, the carriage as well as the spindle nut are stressed during the operation on their seats with respect

to tilting, which, in the case of the carriage, results in an increased edge pressure and, in the case of the spindle nut, results in a one-sided loading of the thread. In addition to all of the above, sufficient space has to be left for the sliding-past of the connecting rod over the entire moving path of the carriage.

Also in the case of pure sliding doors having the initially defined basic construction, it is necessary, for the compensation of tolerances, wear phenomena, different thermal expansions and the like, to use a construction having a connecting rod, which causes the same problems as in the case of swinging-sliding

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doors.

It is an object of the invention to avoid the above-mentioned disadvantages and provide a construction which requires less space, has a dynamically and statically more favorable flow of force and is also cost-effective in its production.

According to the invention, these objects are achieved in that the connection between the spindle nut and the carriage takes place by means of a sliding hinge joint which permits a relative rotating movement as well as a displacing movement in the joint area.

In this manner, it is achieved that the connecting rod can be completely eliminated and that, instead of the two hinge joints, a single hinge joint combined with a displacing seat is provided, which is situated essentially in the area of the direct connection between the axes of the guide rail and the spindle. In this manner, the above-mentioned disadvantages of the force transmission by the unfavorable eccentric arrangement are completely avoided, and the displacing seat is preferably constructed by a claw-type construction of the radial projection

on a relative large surface, so that the surface pressure can be minimized.

Furthermore, this construction permits the axial adjusting

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of the door leaf by inserting or removing shims and thus eliminating the previously necessary adjustment by means of expensive threaded bolts.

In the following, the invention will be explained in detail by means of the drawing.

Figure 1 is a view of a drive coupling according to the prior art;

Figure 2 is a view of a device according to the invention in the swiveled-in positions of the door leaf;

Figure 3 is a view of the device of Figure 2 in the swiveled-out position of the door leaf; and

Figure 4 is a sectional view which extends essentially through the axes of the guide rail and of the spindle.

(Continuation on Page 3 of the Original Specification)

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Enclosure 2 to Our Letter of June 3, 2004

International Application PCT/EP 03/08117 - P42237

CLAIMS:

1. Drive for a sliding door or swinging-sliding door of a rail vehicle, having a guide rail (1) fixed with respect to the rail vehicle, on which guide rail a carriage (2) is longitudinally displaceably and optionally rotatably arranged, which carriage (2) carries a door leaf, and having a spindle drive whose spindle (3) extends parallel to the guide rail (1) and whose spindle nut (4) is fixedly connected with the carriage (2) in the direction of the axis (13) of the spindle (3),
characterized in that the connection between the spindle nut (4) and the carriage (2) takes place by means of a sliding hinge joint (7, 8, 10) which permits a relative rotating movement as well as a displacing movement in the joint area.

2. Drive according to Claim 1,
characterized in that the spindle nut (4) has radially projecting ends (10) which are constructed in a claw-like manner, and interact with an abutment (7) of the carriage (2).

3. Drive according to Claim 2,
characterized in that the abutment (7) consists of a bolt extending parallel to the guide rail (11).

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4. Drive according to one of Claims 1 to 3,
characterized in that the mutually facing surfaces of the components of the sliding hinge joint

(7-10), which extend in a normal manner with respect to the guide rail (1), have a distance from one another which is closed by shims.

5. Drive according to Claim 1,

characterized in that the sliding hinge joint (7-10) has a spindle nut (4) and a cover (9) which is slidable with respect to the spindle nut in a plane normal to the axis (13) of the spindle and carries the ends (10).

6. Drive according to Claim 5,

characterized in that the ends (10) have passage holes parallel to the axis (13) of the spindle (3), through which a bolt is fitted which forms the abutment (7).

7. Drive according to one of Claims 5 or 6,

characterized in that the cover consists of a piece of sheet metal and is bent around the spindle nut.

8. Drive according to Claim 7,

characterized in that the spindle nut has ribs (15) in planes

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normal with respect to the axis (13), which ribs (15) project into indentations or holes (16) of the cover (9).

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